

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Claims 1-14 (canceled).

Claim 15 (currently amended). A manufacturing apparatus of a photo mask blank ~~for carrying out the manufacturing method according to claim 1.~~ having a thin film for forming a pattern on a transparent substrate, the manufacture of said thin film comprising the steps of:

directing the surface of a target downwards and the surface of a substrate upwards with respect to a gravity direction; shielding a peripheral edge of said substrate to prevent the film from being formed on the peripheral edge;  
and sputtering/forming said thin film.

Claim 16 (currently amended). A manufacturing apparatus of a photo mask blank ~~for carrying out the manufacturing method according to claim 2.~~ having a thin film for forming a pattern on a transparent substrate, the manufacture of said thin film comprising a step of:

manufacturing said thin film using a DC magnetron sputtering apparatus comprising at least a sputtering

target, a magnetron cathode with the target attached thereto, a substrate holder disposed opposite to said target, and a shield disposed on an inner wall of a vacuum tank inside the vacuum tank,

wherein the surface of a target is directed downwards with respect to a gravity direction, and

the apparatus has a mechanism for reducing film formation on a non-sputtered area on the target and the surface of the shield.

Claim 17 (currently amended). A manufacturing apparatus of ~~a photo mask blank for carrying out the manufacturing method according to claim 3.~~ according to claim 16, wherein said mechanism for reducing the film formation onto the non-sputtered area on the target comprises a mechanism in which a whole-surface erosion cathode is used as the magnetron cathode, a mechanism for shielding the non-sputtered area on the target, or a mechanism for roughening the surface of a non-sputtered portion on the target.

Claim 18 (currently amended). A manufacturing apparatus of ~~a photo mask blank for carrying out the manufacturing method according to claim 4.~~ according to claim 17, wherein said mechanism for reducing the film formation onto the

non-sputtered area on the target further comprises a mechanism for forming a corner in the target into a curved surface, and roughening an end surface of the target.

Claim 19 (currently amended). A manufacturing apparatus of a photo mask blank for carrying out the manufacturing method according to claim 5. according to claim 16, wherein the mechanism for reducing the film formation on the shield surface keeps the shield at a constant temperature, and a shape of the shield is designed so that a relative film formation speed  $t$  in the following equation (i) in at least a shield position in the vicinity of the target is prevented from being larger than a value in a position on the substrate:

$$t = \cos\theta_1 \times \sin(\theta_1 - \theta_2) / r^2 \quad (i)$$

(in the equation (i),  $r$  denotes a distance between a target center and a shield position,  $\theta_1$  denotes an angle of a line connecting the target center to the shield position with respect to a normal of a target plane,  $\theta_2$  denotes an angle of a shield plane with respect to the normal of the target plane, and  $t$  denotes the relative film formation speed in the shield position defined by  $r$  and  $\theta_1$ ).

Claim 20 (currently amended). A manufacturing apparatus of  
~~a photo mask blank for carrying out the manufacturing~~  
~~method according to claim 6.~~ according to claim 19, wherein  
the mechanism for reducing the film formation onto said  
shield surface comprises a mechanism for forming a corner  
in the shield into a curved surface, roughening the surface  
of the shield, and disposing an earth shield above the  
target plane.

Claim 21 (currently amended). A manufacturing apparatus of  
~~a photo mask blank for carrying out the manufacturing~~  
~~method according to claim 7.~~ according to claim 16, wherein  
the apparatus further comprises a backing plate to which  
the target is to be attached, and the surface of the  
backing plate is roughened.

Claim 22 (currently amended). A manufacturing apparatus of  
~~a photo mask blank for carrying out the manufacturing~~  
~~method according to claim 8.~~ according to claim 16, wherein  
the apparatus further comprises a shield plate for  
preventing the film from being formed on a peripheral  
portion of the substrate.

Claims 23-26 (canceled).

Claim 27 (withdrawn). A pattern transfer method using the photo mask according to claim 23 to transfer a pattern.